

CLAIMS

What is claimed is:

1. A device, comprising:
 - a first comparator adapted to receive a first copy of an input signal and generate a first binary
 - 5 signal;
 - a second comparator adapted to receive a second copy of the input signal and generate a second binary signal; and
 - a logic gate adapted to generate a third binary signal based on the first and second binary signals, wherein:
 - 10 the input signal corresponds to a duobinary sequence; and
 - the third binary signal is a binary representation of the duobinary sequence.
2. The device of claim 1, wherein the input signal is an analog signal.
- 15 3. The device of claim 1, wherein the logic gate comprises an exclusive-OR gate.
4. The device of claim 1, further comprising a splitter adapted to receive the input signal and generate the first and second copies.
- 20 5. The device of claim 4, wherein the splitter has a bandwidth of about $1/2T_b$, where T_b is a bit period corresponding to the input signal.
6. The device of claim 5, wherein each of the first and second comparators and the logic gate has a bandwidth of about $1/T_b$.
- 25 7. The device of claim 1, wherein the input signal corresponds to a bit rate of higher than about 10 Gb/s.
8. The device of claim 1, wherein:
- 30 for each comparator,
 - when voltage applied to a first input port is equal to or higher than voltage applied to a second input port, the corresponding binary signal has binary "0"; and
 - when the voltage applied to the first input port is lower than the voltage applied to the second input port, the corresponding binary signal has binary "1".

9. The device of claim 8, wherein:

for the first comparator,

the first copy is applied to the first input port; and

a first threshold voltage is applied to the second input port; and

5 for the second comparator,

a second threshold voltage is applied to the first input port; and

the second copy is applied to the second input port.

10 10. The device of claim 9, wherein the logic gate is an exclusive-OR gate.

11. The device of claim 8, wherein:

for each comparator,

a corresponding threshold voltage is applied to the first input port; and

the corresponding signal copy is applied to the second input port.

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12. The device of claim 11, wherein the logic gate is an exclusive-NOR gate.

13. The device of claim 1, wherein the device is implemented in an integrated circuit.

20 14. A method of signal processing, comprising:

(A) comparing magnitude of an electrical signal with first and second threshold voltages to generate first and second binary values;

(B) applying a logic function to the first and second binary values to generate a third binary value; and

25 (C) repeating steps (A) and (B) to generate a sequence of third binary values, wherein:

the electrical signal corresponds to a duobinary sequence; and

the sequence of third values is a binary representation of the duobinary sequence.

30 15. The method of claim 14, wherein the logic function comprises an exclusive-OR function.

16. The method of claim 14, wherein, for step (A):

for each threshold voltage,

when the magnitude of the electrical signal is equal to or higher than the threshold voltage, the corresponding binary value is "0"; and

35 when the magnitude of the electrical signal is lower than the threshold voltage, the corresponding binary value is "1".

17. The method of claim 14, wherein, for step (A):

when the magnitude of the electrical signal is equal to or higher than the first threshold voltage, the first binary value is "0";

5 when the magnitude of the electrical signal is lower than the first threshold voltage, the first binary value is "1";

when the magnitude of the electrical signal is equal to or lower than the second threshold voltage, the second binary value is "0"; and

10 when the magnitude of the electrical signal is higher than the second threshold voltage, the second binary value is "1".

18. A data transmission system designed to use duobinary signaling, the system including a device comprising:

15 a first comparator adapted to receive a first copy of an input signal and generate a first binary signal;

a second comparator adapted to receive a second copy of the input signal and generate a second binary signal; and

a logic gate adapted to generate a third binary signal based on the first and second binary signals, wherein:

20 the input signal corresponds to a duobinary sequence; and

the third binary signal is a binary representation of the duobinary sequence.

19. The system of claim 18, further comprising:

an encoder coupled to a transmission channel, wherein:

25 the encoder is configured to generate the duobinary sequence based on a received binary sequence and apply the duobinary sequence to the transmission channel; and

the transmission channel is configured to apply the input signal to the device.

30 20. The system of claim 19, wherein the binary sequence received by the encoder has inter-symbol correlation data.

21. A device, comprising means for converting an analog duobinary signal into a digital binary signal, wherein:

the duobinary signal is compared with first and second threshold voltages; and

35 the digital binary signal is generated based on results of the comparison.

22. The device of claim 21, wherein the means for converting comprises a differential exclusive-OR device.